4. $\frac{1}{135}(9 \cos 2x - 8 \sin 2x)$

Physics

Section Number :	2
Mandatory or Optional :	Mandatory
Number of Questions :	25
Number of Questions to be attempted :	25
Section Marks :	25
Display Number Panel :	Yes
Group All Questions :	Yes
Mark As Answered Required? :	Yes

Question Number : 51 Question Id : 61097513679 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Young's modulus of steel is 2×10^{11} N/m^2. Its value in dyne/cm^2 is

Options :

1. 2×10^{12}

2. 2×10^{10}

3. 2×10^{8}

4. 2×10^{-11}

Question Number : 52 Question Id : 61097513680 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Dimension of velocity gradient is

Options :

1. $[M^0L^0T^{-1}]$

2. $[ML^{-1}T^{-1}]$

3. $[M^0LT^{-1}]$

4. $[ML^0T^{-1}]$

Question Number : 53 Question Id : 61097513681 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Unit vector parallel to the resultant of vectors $A = 4\hat{\imath} - 3\hat{\jmath}$ and $B = 8\hat{\imath} + 8\hat{\jmath}$ will be

Options :

1. $\dfrac{24\hat{\imath}+5\hat{\jmath}}{13}$

2. $\dfrac{12\hat{\imath}+5\hat{\jmath}}{13}$

3. $\dfrac{6\hat{i}+5\hat{j}}{13}$

4. $\dfrac{12\hat{i}-5\hat{j}}{13}$

Question Number : 54 Question Id : 61097513682 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The resultant of two forces 3P and 2P is R. If the first force is doubled, then the resultant is also doubled. The angle between the two forces is

Options :

1. 60^0

2. 120^0

3. 30^0

4. 135^0

Question Number : 55 Question Id : 61097513683 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A particle is projected vertically upward with a speed of 40 m/s, then the velocity of the particle 2 seconds before it reaches the maximum height is (Take g = 10 m/s^2)

Options :

1.

20 m/s^2

2. 4.2 m/s^2

3. 9.8 m/s^2

4. 10 m/s^2

Question Number : 56 Question Id : 61097513684 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A car moving with constant acceleration covered the distance between two points 60 m apart in 6 s. Its speed as it passes the second point was 15 m/s. The acceleration is

Options :

1. $\frac{1}{3} \text{ ms}^{-2}$

2. $\frac{2}{3} \text{ ms}^{-2}$

3. $\frac{3}{5} \text{ ms}^{-2}$

4. $\frac{5}{3} \text{ ms}^{-2}$

Question Number : 57 Question Id : 61097513685 Question Type : MCQ Display Question

Number : Yes Is Question Mandatory : No Single Line Question Option : No Option

Orientation : Vertical

A stone is thrown vertically upwards. When stone is at half of its maximum height, its speed is 10 ms^{-1}; then the maximum height attained by the stone is (g=10m/s^2)

Options :

1.   25m

2.   10m

3.   15m

4.   20m

Question Number : 58 Question Id : 61097513686 Question Type : MCQ Display Question

Number : Yes Is Question Mandatory : No Single Line Question Option : No Option

Orientation : Vertical

Identify the correct statement.

Options :

1.   Static friction depends on the area of contact.

2.   Kinetic friction depends on the area of contact.

3.   Coefficient of static friction does not depend on the area of the surface in contact.

4.   Coefficient of kinetic friction is less than the coefficient of static friction.

Question Number : 59 Question Id : 61097513687 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The coefficient of friction between the tyres and the road is 0.25. The maximum speed with which a car can be driven round a curve of radius 40 m without skidding is (assume g=10m/s^2)

Options :

1. 40 ms^{-1}

2. 20 ms^{-1}

3. 15 ms^{-1}

4. 10 ms^{-1}

Question Number : 60 Question Id : 61097513688 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

During a projectile motion, if the maximum height is equal to the horizontal range, then the angle of projection with the horizontal is

Options :

1. $\tan^{-1}(1)$

2. $\tan^{-1}(2)$

3. $\tan^{-1}(4)$

4. $\tan^{-1}(3)$

Question Number : 61 Question Id : 61097513689 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The potential energy of a certain spring when stretched through a distance S is 10 joule. The amount of work (in joule) that must be done on this spring to stretch it through additional distance S will be

Options :

1. 30

2. 40

3. 10

4. 20

Question Number : 62 Question Id : 61097513690 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A machine gun fires six bullets per second into a target. The mass of each bullet is 3 g and the speed is 500 m/s. The power delivered to the bullets is

Options :

1. 1.5 kW

2. 2.25 kW

3. 0.75 kW

4. 375 kW

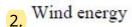**Question Number : 63 Question Id : 61097513691 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

Which of the following is the cheapest renewable energy ?

Options :

1. Solar energy

2. Wind energy

3. Hydel energy

4. Nuclear energy

Question Number : 64 Question Id : 61097513692 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
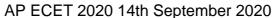
The maximum velocity of particle executing simple harmonic motion with an amplitude of 7 mm is 4.4 m/s. The time period of oscillation is

Options :

1. 100 s

2. 10 s

3. 0.1 s

4. 0.01 s

Question Number : 65 Question Id : 61097513693 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Two waves of lengths 50 cm and 51 cm produced 12 beats per second. The velocity of sound is

Options :

1. 340 m/s

2. 331 m/s

3. 306 m/s

4. 360 m/s

Question Number : 66 Question Id : 61097513694 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The apparent frequency of the whistle of an engine changes in the ratio 9:8 as the engine passes a stationary observer. If the velocity of the sound is 340 ms^{-1}, then the velocity of the engine is

Options :

1. 40 m/s

2. 20 m/s

3. 340 m/s

4. 180 m/s

Question Number : 67 Question Id : 61097513695 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Quality of sound is decided by

Options :

1. loudness

2. intensity

3. number of overtones

4. frequency

Question Number : 68 Question Id : 61097513696 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Inaudibility limit is

Options :

1. one hundredth of initial intensity

2. one tenth of initial intensity

3. one thousandth of initial intensity

4. one millionth of initial intensity

Question Number : 69 Question Id : 61097513697 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A Carnot's engine operates with source at 127^0C and sink at 27^0C. If the source supplies 40 kJ of heat energy, the work done by the engine is

Options :

1. 30 kJ

2. 10 kJ

3. 4 kJ

4. 1 kJ

Question Number : 70 Question Id : 61097513698 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A monoatomic gas initially at 17^0C is suddenly compressed to one eighth of its original volume. The temperature after compression is

Options :

1. 1160K

2. 36.25K

3. 2320K

4. 887K

Question Number : 71 Question Id : 61097513699 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Two cylinders of volumes 20 cc and 30 cc have gases at pressures 40 cm and 50 cm of Hg under the same temperature. If they are connected by a very narrow pipe the pressure in cm of Hg will be

Options :

1. 45

2. 50

3. 46

4. 15

Question Number : 72 Question Id : 61097513700 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In an adiabatic expansion, a gas does 25J of work while in an adiabatic compression 100J of work is done on a gas. The change of internal energy in the two processes repectively are

Options :

1. 25J and -100J

2. - 25J and 100J

3. -25J and -100J

4. 25J and 100J

Question Number : 73 Question Id : 61097513701 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The volume of one mole of an ideal gas changes from V to 2V at temperature of 300 K. If R is universal gas constant, then work done in this process is

Options :

1. $300Rln2$

2. 600Rln2

3. 300ln2

4. 600ln2

Question Number : 74 Question Id : 61097513702 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The maximum kinetic energy of the photoelectrons emitted from a surface is dependent on the

Options :

1. intensity of incident radiation

2. potential of the collector electrode

3. frequency of incident radiation

4. angle of incident of radiation of the surface

Question Number : 75 Question Id : 61097513703 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In an optical fibre, relation between refractive index of core (n_1) and refractive index of cladding (n_2) is

Options :

1. $n_1 > n_2$

2. $n_1 < n_2$

3. $n_1 = n_2$

4. $n_1 \ll n_2$

Chemistry